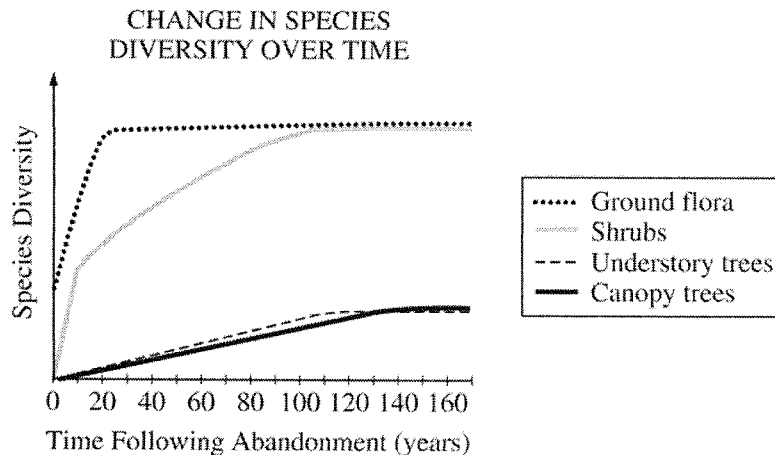


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Question 2

Ecological succession describes the pattern of changes in communities over time. The graph below shows changes in plant diversity following the abandonment of an agricultural field in a temperate biome.



- (a) **Discuss** the differences in plant diversity shown in the graph and **explain** how the changes affect the animal species composition between years 0 and 120.
(4 points maximum)

Discussion of differences in diversity shown in the graph (2 points maximum)

- Differences in the amount of diversity
 - More diversity in ground flora and shrubs
 - Less diversity in understory and canopy
- Differences in the rate of change in diversity
 - Rapid change in ground flora and shrubs
 - Slow change in understory and canopy
- Differences in the rate to community stabilization
 - Faster for ground flora
 - Slower for understory and canopy

Explanation of effect on animal species composition (2 points maximum)

- Pioneer community consists of small herbivores, insects, and other small, ground-dwelling animals.
- Climax community consists of insects, birds, and mammals and is multilayered.

- (b) **Identify** TWO biotic and TWO abiotic factors and **discuss** how each could influence the pattern of ecological succession.
(4 points maximum)

Examples of biotic factors (1 point for each identification and 1 point for each appropriate discussion of its influence on succession; 2 points maximum)

- Competition
- Predation
- Herbivory

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Question 2 (continued)

- Disease
- Parasitism
- Seed dispersal
- Nitrogen fixation
- Reproductive strategy
- Human impact

Examples of abiotic factors (1 point for each identification and 1 point for each appropriate discussion of its influence on succession; 2 points maximum)

- Climate
- Rainfall
- Light
- Wind
- Temperature
- Soil composition
- Fire
- Drought
- Altitude
- Geographic location

- (c) **Design** a controlled experiment to determine how the diversity of plant species in a newly abandoned field would be affected by large herbivores.
(4 points maximum)

Experiment design (1 point each)

- Identify the independent variable and how it is manipulated.
- Identify the dependent variable and how it is measured (e.g., “count number of species”; not “observe diversity”).
- Discuss variables to be held constant (at least three; one can be “divide the field in half”).
- Identify the control (e.g., no herbivores).
- Verification and replication (e.g., large plot or many plots).
- Hypothesis or testable prediction related to species diversity.